

AVIATION

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Special Features

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Air Traffic in Italy During 1926
Design Reactions From the Spokane Races
The Cost of Successful National Distribution

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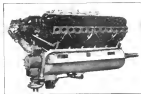
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Second, Lt. G. A. McHenry, USA, in Curtiss Falcon
Average Speed 164 MPH

Winners of Free For All Pursuit Ship Race

First, Lt. Eugene Hatten, USA, in Curtiss Hawk
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Second, Lt. A. J. Lyon, USA, in Curtiss Hawk
Average Speed 189 MPH

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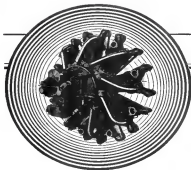
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With the Editor

As the result of the increased popularity of aviation in this country and therefore the increased production and sales of airplanes, a paramount problem that now confronts the aircraft manufacturers is the matter of obtaining national distribution of their products at a minimum cost.

On page 942 of this issue of AVIATION is to be found an article entitled, "The Cost of Successful National Distribution." It has been written as the result of an investigation into the question and enlarges upon seven factors to be considered in obtaining national distribution. Although such a subject cannot be covered in one writing, you will find the article very interesting, and, perhaps, some part of it can be profitably applied to your own business.



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Vol. XXIII

October 15, 1937

No. 16

Toney Yackey

IN THE death of Toney Yackey aviation has suffered a great loss. All those who met him were impressed by the dynamic energy of the man, by the strength of his views and by his ability to put things across. In the hard pioneering days when every one was hesitant definition Toney Yackey not only made a living out of commercial aviation but built up a real business. He fearlessly abandoned those things which he considered were right and his influence was felt not only in the way in which he lived but throughout the country. Toney Yackey's wide circle of friends here felt his death deeply but his influence will remain as an inspiration for those who are destined to carry on his work.

adopt an idea which he has developed provided he receives proper credit for the development. Commercially speaking the general adoption of an idea by the trade is the best of advertising for the firm which has done the original development work. From the military viewpoint the matter is very different. If these men are encouraged to the development work and to bring out new ideas they must be able in some way to capitalize the development of ideas which cannot be completely covered by patents. The government can, does, and should recognize the necessity of rewarding firm which use new ideas in practical applications. Progress in military planes depends to a large extent on the encouragement which is given to the development of "proprietary rights."

Proprietary Rights

EVEN IN an art which is changing so rapidly as aviation there are comparatively few innovations which can be put into immediate practice. Progress almost invariably comes through a slow and discouraging process of gradual perfection. Some men in this, which may be better than the slow in use at the time but it takes years of persistent effort and expense before it finally can surpass the existing practice. In certain cases such as the Handley Page closed wing or the Fairchild Conquest engine certain features can be more or less protected by patents. Other fundamentally sound ideas such as the use of welded metal tubes in fuselages in which Anthony Fokker played such a prominent part cannot be covered by patents but should receive some sort of recognition.

But in one of the best examples of this is the composite and metal construction as applied to the plane and which has been under development by General for a period of over fifteen years. The idea is not complicated one but it goes against traditional practices and, as such, was taken to more years there were many problems to be solved in the metal fast to the wood and in preventing where water leaked in between metal and wood or weakness of the idea was proved only after years of experimenting and much practical testing. The fact that several commercial designs using this form of construction the best kind of proof of its value.

The development of such ideas as these can not be in the normal commercial sense of the word but the idea is often glad to use other firms

Aerial Rough Riding

NORMALLY THE sky is a smooth and pleasant place, occasionally it is bumpy enough to be real to passengers and even on a long time the air seems smooth about in settling chambers which has a place about in a manner which is undesirable. The latter condition occur so rarely in normal flying that the average passenger plane is almost not really designed to meet the emergency. The airplane must, it is usually designed with a sufficient factor of safety but in the design of the seats and so forth it is often assumed that as the plane will not be wrecked that there is no need to take the precautions which are taken in passenger planes.

The matter is not so however which should be taken too lightly. In a closed cabin plane if a storm should break loose or the passengers should be thrown to one end of the plane or the other it would almost result in disaster. One accident of last year in which many lives were lost is directly traceable to the chairs having been loosely placed in the cabin with the result that all the passengers were thrown forward during a forced landing in a storm and the plane went into a nose dive from which it did not recover. Chairs should not only be firmly attached to the cabin with straps of safety, even greater than those for the rest of the plane but they should be given such a shape that the passengers can hold on comfortably, and for really bad weather a safety belt should be provided.

Open cockpit planes should all be provided with safety belts and the passenger made to use them. There is nothing more terrifying to a passenger than to be thrown even a few inches off his seat. And even if a passenger can hold on in case of a severe storm so as to be considerably in his comfort.



A Dornier Wal passing a section of Genoa on the Geneva-Palermo route

Air Traffic in Italy During 1926

THE ITALIAN AIR MINISTRY has just published a statistical report covering 1926 air traffic on the five Italian air lines: Turin-Trieste; Venice-Trieste-Sera; Geneva-Palermo; Brindisi-Athen-Constantinople; and Venice-Vienna. The Turin-Trieste line (operated by the S.I.A.—Società Italiana Servizi Aerei) was flown from April 1 to Oct. 15. Out of the 305 flights it could not be terminated and 20 were terminated with considerable delay. These delays were chiefly due to the weather conditions (23 out of 35), and 12 were even to engine defects.

As regards the nine interrupted flights, machine defects were mentioned in three cases and engine troubles in six cases. The total percentages are as follows: Regular flights, 90.42 per cent; flights delayed by weather conditions, 6.54 per cent; flights interrupted owing to machine defects 0.85 per cent; flights interrupted owing to engine troubles, 2.33 per cent. No accidents to passengers were reported during the six months operation.

General results: No. of flights, 358; miles flown, 125,306; passengers carried, 1,362; mail in lb. 2,380; freight and baggage in lb. 26,290; occupied places on board the airplanes, 37.32 per cent.

On Oct. 16, 1926, the service on the air line Turin-Venice

was suspended, and at the same date a special holiday service began on the line Venice-Trieste-Sera and was continued up to Dec. 31. One hundred and twenty-five regular flights were carried out on the line Venice-Trieste, some of which suffered a negligible delay. On the line Trieste-Sera, 62 flights took place regularly, and two had to be interrupted owing to weather conditions. There were no accidents to passengers, and no damage whatever to the material.

General results: No. of flights, 214; miles flown, 22,810; passengers carried, 290; mail in lb. 221; freight in lb., 3,475; occupied places on board the airplanes, 26 per cent; regular flights on the stage Venice-Trieste, 100 per cent; regular flights on the stage Trieste-Sera, 96 per cent.

The Geneva-Palermo line is operated by the "Società Anonima di Navigazione Aerea." It should be considered as consisting of three different lines, Geneva-Gates (Fiume), Gênes-Naples and Naples-Palermo. Each was flown in both directions by a different airplane, two times weekly during the first month, three times weekly during the second month, and two times weekly from the third month on. From April 7 to the 31, 1926, 110 flights were planned for the line Geneva-Gates and 135 flights for both the other lines.

The actual flights made are as follows: Geneva-Gates 90,

Gênes-Naples, 204, and Naples-Palermo, 192. Total number of flights made, 486.

One of the total flights, only five had to be interrupted. Two owing to engine troubles, two owing to machine defects and one to weather conditions. Considered as a whole the percentage for regular flights, 98.30 per cent; flights interrupted owing to weather conditions, 25.25 per cent; flights interrupted owing to machine defects, 1.55 per cent, and flights interrupted owing to engine troubles, 3 per cent. There were no accidents to persons during the nine months.

The following is the general operation of the Geneva-Palermo line for six months.

REGULAR FLIGHTS						
No. of flights	Miles flown	Passengers carried	Mail in lb.	Freight in lb.	Occupied places	Percentage
100	10,000	1,000	1,000	10,000	1,000	1,000

OTHER FLIGHTS						
No. of flights	Miles flown	Passengers carried	Mail in lb.	Freight in lb.	Occupied places	Percentage
10	1,000	100	100	1,000	100	100

The air line Brindisi-Athen-Constantinople, was operated by the "Società Anonima Aerea Espresso Balkan" from August 1 to the end of December with two flights weekly in both directions. The total number of planned flights was 84; only 49 were actually taken place, some of which had to be interrupted. This gives a percentage of regularity of 77.50 per cent, while five per cent of the flights had to be interrupted owing to the bad weather conditions, 5.60 per cent, to machine defects, and 15 per cent, owing to engine troubles. There were no accidents to passengers.

Single Engine Planes Used

Total results of five months operation are as follows: miles flown, 33,090; passengers carried, 57; mail in lb. 355; and freight in lb. 11,945.

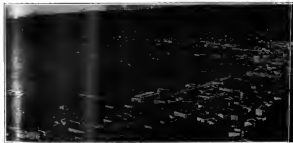
The Venice-Vienna line was operated with single engine planes. On October 4 Dornier three engine plane was scheduled from Aug. 18 to the end of December. During the first month the line was flown three times weekly. During the second month the service was operated daily, but on Oct. 16 the line Venice-Klagenfurt. From the third month the total number of flights should have totaled 136 but only 150 were actually carried out. Out of these 150 flights 79 covered the whole line and 44 the stage Venice-Klagenfurt (the service on the stage Klagenfurt-Vienna having been suspended for a month). On the other side 30 flights had to be interrupted owing to the bad weather conditions and were terminated on the following days. The regular flights amounted to 72 per cent. No accidents to passengers.



A map showing the routes of the five Italian air lines.

It seems worth mentioning that the air service on the line Venice-Vienna across the Alps, considered hitherto as a formidable hindrance to air traffic, was maintained during the whole winter. As a matter of fact most European air lines suspend their activity during the winter time.

Total operation data referring to the whole line is as follows: miles flown, 320,380; freight in lb. 2,524; passengers carried, 3,081; mail in lb. 3,470; freight in lb. 68,506; occupied places on board the airplanes, 8,712; occupied places, 5.91 or 45.66 per cent.



An aerial view of the harbor at Trieste as seen at the Turin-Trieste route.

Design Reactions from the Spokane Pursuit Races

By COMDR. E. E. WILSON*

FROM THE standpoint of the Naval and Military Services, three events of the Spokane National Air Race are of outstanding interest. These are: Event XII, Race for Pursuit Type Army Airplane, Event XIII, Alexander Paraglider Trophy Race for Navy Pursuit Type Plane, and Event XIV, Spokane Spokesman-Review Trophy Free For All Military Pursuit Race. The results of these events may be differently interpreted, the final interpretation depending upon how deeply the analysis goes. It is the purpose of this paper to analyze results from the standpoint of their bearing on military design and tactics.

Event VII was confined to airplanes of the Pratt & Whitney Group, U.S.A., the entrants being three standard Curtiss P-13's and one Boeing PW-3-A, all with Curtiss D-12 water-cooled engines. The event was won by Lieut. W. R. Courtes with 154.432 m.p.h. Lieut. A. C. Woodring was second with 150.608 m.p.h. and Lieut. L. C. Mahoney was third at 151.608 m.p.h. Lieut. W. A. Maxwell is the only Boeing PW-3-A to finish with 153.583 m.p.h.

Speed Difference of 15.6 M.P.H.

Event XIII, the Alexander Paraglider Trophy Race for Navy Pursuit Type Airplane, had five entrants. It was won by Lieut. T. R. Neier, U. S. Navy, in a Boeing PW-3 (Boeing P-3-A 1500 water-cooled engine) with a speed of 177.848 m.p.h. Lieut. G. F. Rogers, U. S. Navy, was second with 172.072 m.p.h. and Lieut. H. R. Rogers, U. S. Navy, was third at 171.905 m.p.h. Corresponding winners of the Army pursuit race, we note that the Army race was won with a speed of 158 m.p.h. in one of the best speed of the Army race.

The difference in due to the employment in the Boeing Fighters at a 525 hp. water-cooled Packard engine as against the 425 hp. water-cooled Curtiss D-12 of the Army standard pursuit airplane. The Navy entrants came from one of the standard fighting plane squadrons of the Battle Fleet and their airplanes were the Navy standard of a year ago. It was in a similar airplane that Lieut. G. F. Coffey, U. S. Navy, won the Free-For-All Pursuit Race at Philadelphia last year.

High Speed in a Standard

Two superiority in high speed of the Navy fighters is at once apparent at considerable cost in other factors of performance. Manifestly, the employment of increased power must carry with it increased fuel capacity, at the full throttle range of the high powered plane is so equal to that of the low powered plane. This in turn means an increased gross weight with a corresponding increase in wing loading of the same wing area and wing loading. Although the power loading has gone down the wing loading has gone up and the results are felt, first, in an increased landing speed, second, in a reduced rate of climb, third, in a reduced ceiling, fourth, in a reduced speed at altitude, fifth, in a reduced maneuverability at altitude. In other words, for a gain in high speed in one line, we have sacrificed all of the desirable characteristics.

See at altitude. The employment of high power is so manifestly a disadvantage.

In the Navy pursuit race, Capt. F. G. Rogers, U. S. Navy, Corp., was fourth in a Curtiss "Black" with a Pratt & Whitney Wasp engine. His speed being 159.833 m.p.h. The was 15.2 m.p.h. slower than the speed of the Packard P-13 fighter. It is significant, however, that the Pratt & Whitney (Wasp) Hawk was 1.4 m.p.h. faster than the standard Curtiss D-12 Army standard plane. Both the D-12 and Wasp are rated at 425 m.p.h. This proves publicly and conclusively, what has long been known as a result of Navy flight tests, that the so-called engine, far from being inferior to the standard of high speed at sea level, is definitely superior to the water-cooled engine of equal power.

Long Series of Flight Tests

The skepticism by the Navy of the Pratt & Whitney Wasp in the Spokane is the result of definite information given in a long series of flight tests conducted with the greatest care at the Navy Air Station, Annapolis. The detailed results of this analysis are not available for publication in the present preliminary report as revealed at this time. The job was largely an investigation of the performance of Navy fighting aircraft at altitude and the final results are most interesting.

For instance, just as the Curtiss D-12 fighter was superior to the higher powered Packard Racing Fighter as was the Pratt & Whitney Wasp equipped fighter superior to the Curtiss D-12. This superiority is very apparent from the standpoint of speed at altitude, rate of climb and maneuverability. The superiority of the high powered fighter in speed at sea level is due to the increased horsepower available but it is obtained at the expense of increased wing loading, the inevitable result of increased wing loading.

Factor of Landing Speed is Vital

Now this factor of landing speed is vital to the whole aircraft. If most airplanes are to be of any use whatever, they must have low landing speeds to permit their employment from the decks of carriers as well as on rough water. This landing speed factor has not been considered at so much moment in military aviation and yet it was so prominent at Spokane, and it has become even more prominent at landing both having elevations of 5,000 to 10,000 ft., that this high landing speed restricts the employment of fighters to specially prepared fields.

Unfortunately, when we increase the wing area of an airplane sufficiently to reduce the landing speeds to a degree suitable for use at sea, we also reduce the high speed at sea level. This would be serious were it not for the fact that this reduction in wing loading enables us to go to the top speed at about 12,000 ft. and to greatly improve its speed from that point on. The light wing loading results in a lower rate of climb, better maneuverability. Manifestly, this low service use is it not to sacrifice speed at sea level for the factor of the other desirable qualities.

With this position established it is interesting now to look

into the other event in the National Air Race, namely, Event XII, the Free-For-All Military Pursuit Ship Race. This race was won by Lieut. E. R. Hatten with a speed of 301.830 m.p.h. His airplane was the Curtiss XP-3-A. These results and the fact that the airplane had a Curtiss V-1550 high compression water-cooled engine and that it was equipped with PW-3 wings and wing radiators. The question may well be asked, "Is this kind of speed indicative the desire of a new era in pursuit plane design?" The answer is found in the further results of the same event.

In the final phase in the race was won by Lieut. A. C. Woodring with a speed of 158.608 m.p.h. Lieut. L. C. Mahoney was second with 151.608 m.p.h. Lieut. W. R. Courtes was third with 154.432 m.p.h. In other words his airplane was similar to that of Lieut. Hatten, except that it had the standard type radiator. The difference in the two speeds is 13.6 m.p.h. which is a reasonable indication of the need of the tuned type radiator. It has repeatedly been shown that the wing radiator is chiefly required to serve as not only because of its maneuverability but also because of its great difficulty of maintenance. The winner of the race then has not landed in any way of value in the design of service type airplanes.

Not Suited for Service Use

Told plans in the race was won by Lieut. T. P. Butler with a speed of 158.608 m.p.h. (Pursuit 2) and 150.608 m.p.h. (Pursuit 1) 150.608 m.p.h. The Navy entrants used the standard compression Packard engine which develops about the same power as the new Curtiss V-1550 engine when the latter is equipped with standard compression. In the race the two Curtiss 1550's were employing high compression ratios and high rpm. speeds developed high power. It is well known that such high compression ratios and high rpm. speeds are not suitable for service use, and so the winner of several place has an unquestioned sacrifice of particular value in the design of fighter airplanes.

It has previously been shown that, as a result of the experience tests at Annapolis, the Navy abandoned the use of the high powered water-cooled Packard engine in favor of a lower powered Pratt & Whitney Wasp air-cooled engine, because of superior performance at altitude. The winner of that place, then, has shown nothing of interest in fighter design. The Curtiss Hawk with the Pratt & Whitney engine

won by Lieut. F. C. Rogers did 163.555 m.p.h. in this same Free-For-All Pursuit Race, being credited in speed only by the F.B.I. and a speed being PW-3-A. From this it is manifest that, although the Free-For-All Pursuit Race is a new showed some interesting high speeds, it revealed no new information in the design of fighting aircraft intended to fight at altitude.

It has frequently been stated that airplane racing leaves the same relation to airplane development as does automobile racing to automobile design. This is a very close analogy. The automobile race has helped develop speed in automobile design but for the other factors of automobile design we have to look elsewhere, in the proving ground, for the final result. So also in airplane racing we look to our flight tests for development of our airplanes that go to make good fighting airplanes. The speed shown at the Spokane race indicates the result of the combination of good engines, good airplanes and good flying. They must not be considered, however, as indicating the trend in present design very much as they are shown to influence this design too much. The Army air-cooled aircraft engine relies its superiority, both at sea level and at altitude, when the results are reduced to a common denominator. No advantage of a high compression, high speed, wing radiators, heavily loaded water-cooled fighter can make the air-cooled engine's unreasonable position at high altitude.

Aero Club to Buy a JN4

ACCORDING to a statement issued by the American Society for Promotion of Aviation the Quince Aero Club of Quinceboro, L. I., has obtained sufficient money for the purchase of a JN4 plane which is to be used for instruction and joy flying by its members. Flying instruction is to be given by Colonel Roberts, ex-U.S.F.C., Capt. Arthur Spence, ex-French Air Service, and Lieut. J. G. Kelley, U. S. Air Service Reserve.

The Quince Aero Club is the result of an expansion of the Quince Aero Club, Athens, L. I., which was organized by the A.S.P.A. in July with a membership of two. Since that time over 100 applicants have been admitted.

America's Queen of the Air at Rest



A good view of the Sikorsky S-1 shown, showing at the receiver with the U.S. Air Service at her morning man. At the extreme left is the "Big Bird" J-1 and to the right is an Army airplane. Between this and the Los Angeles can be seen a plane flying in the sky.

*Formerly head of the Design Section of the Bureau of Aeronautics, now Naval Air Commandant, Naval Air Station, San Diego.



Front quarter view of the new Daniel Guggenheim School of Aeronautics at New York University

The Daniel Guggenheim School of Aeronautics

A SHORT TIME ago the Daniel Guggenheim School of Aeronautics was formally opened at its new building at New York University. University Heights, New York. The new building is a two-story structure, 139 ft.

by 30 ft. with a one-story projection housing two wind tunnels, one four feet in diameter attaining an air speed of 50 m.p.h. and the other six feet in diameter with an air speed averaging 130 m.p.h. In addition, the building is equipped for aeromechanical instruction, structural tests and research. There is an up-to-date model shop equipped with tools and machinery for the construction of wind tunnel models and small aircraft parts. A power plant laboratory, one of the most complete in the country, will be equipped for testing complete airplane engines, the study of cooling and lubrication problems, and for testing typical engine cylinders.

The larger wind tunnel is of the open balance, double return type having an experimental chamber nine feet in diameter and nine feet long



Structures and students in the experimental chamber of the six-foot wind tunnel.

The six is forced through by an eight bladed propeller 17 ft. 6 in. in diameter, driven by a 250 hp. motor. The determination of the heads for the series of tests of the wind tunnel was the result of considerable research and experiment. Two famous students, Edward H. Rossiter and John C. Moore performed a series of experiments in the experiment of their thesis for their Bachelor degrees. They compared the velocity distributions and power absorptions of the Crocco, Witkowski and Götting types of entrance heads for the tunnel. These experiments and also later experiments were performed on a sixth size model of the large tunnel. From the result of the work a final design was made and the full size wind tunnel was constructed. The tunnel is now in operation through the work of completely calibrating it will require some time.

The experiments by Boile and Mazen were performed upon a model tunnel with no return, tests. In that run when the propeller revolved the air around the entrance head it had a surface

skin at the start as it came from the unobstructed air. At the working section a series of traverses with various types of heads were taken to determine the type of head that gave the most uniform flow. It is at this working section an experimental chamber exists, at the full size tunnel, the airplane model is placed and a uniform air flow, approximating actual flight conditions, is desired.

The model, as in the full size tunnel, had an octagonal type of section. It was five inches in diameter, making it one foot in diameter at the mouth. The entrance cones and the wall of section were of copper while the entrance heads and support were of galvanized steel and wood. All models and parts were tested and smoothed with plaster. A four bladed wood propeller was driven by a belt from a calibrated motor. The tests were each made with a different type of head. Traverses of 100 readings each were taken to determine the pressure distribution over the entire working section. The air speed was 20 m.p.h. Two traverses for each type of head were made, one with and one without a honeycomb at the entrance.

Three Types of Heads Studied

The type of heads studied were the Crocco, Witkowski and Götting. The Crocco type of tunnel with the heads as the air of a series, showed a higher velocity at the center of the experimental chamber than at the sides. In addition, this type of head absorbed more power than any of the others. The heads of the Witkowski type tunnel are designed to be streamline, giving a much better distribution of flow than the Crocco type. However for the same speed of the air, 14.3 per cent less power for the same speed of the air. The Götting type tunnel defects the air around the heads by a number of vanes. In the first two types mentioned, tests were made with and without a honeycomb at the entrance to the experimental chamber and it was found that the honeycomb, though it increased some power, improved the flow. The flow with the Götting type heads was in some places that the improvement due to the honeycomb was hardly appreciable. The power consumption with



The motor generator set in the basement and the six hp. motor in the test room to drive the New York University six foot wind tunnel.

Götting type of head was very high due to the work done on the air pulling it through the vanes.

When the construction was done regarding the type of head to be used it was decided that the Götting type, with the Crocco type of head was best and from the practical viewpoint, the Witkowski type was to be recommended. It was concluded that the Witkowski type of head gave a better velocity gradient and was more practical both from the viewpoint of construction. As the actual tunnel at the head is 18 ft. high, it was immediately apparent that maintenance and construction of a number of sizes (as in the Götting type) of that height would be considerable. The Witkowski



The one sixth size model used in determining the heads of the full size wind tunnel.

head was decided upon in favor of the Crocco as it gives a better velocity distribution with a lower power absorption.

After the series of experiments were completed it was found that the 12 in. wind tunnel was very handy for working out model problems and requiring a great deal of money. The power required to perform these experiments was almost negligible when compared to that required to run a full size tunnel.

The actual wind tunnel is 165 ft. long and 37 ft. 6 in. wide. It is in a steel frame building. The floor of the return takes is of concrete, while the walls and ceiling are of special plaster. The experimental chamber is of space in a wood frame. This section, which is nine feet long is responsible for the establishment of a propeller and motor fan propeller testing.

An arrangement is now being built whereby replace models fixed with rotating scale size propellers may be installed in the tunnel. Bifurcated wind tunnel models were tested without a propeller attached and then without any slip stream effect (which must be corrected for).

The air is drawn through the tunnel by an eight bladed centrifugal propeller driven by a 350 hp. direct current motor. The power plant is in a room adjoining the wind tunnel, the electric motor, which is supplied by a large motor-generator set, can be controlled from this room or from the instrument or balance platforms placed at the end of the tunnel. On this platform are all the controls and instruments. The forces of the wind tunnel model are measured by a wire suspension type balance with electrically actuated balancing weight arms.

Tunnel in Operation for Three Years

Adjacent to the main wind tunnel, outside the building proper, is an additional structure housing a four foot, square section, wind tunnel of the conventional British National Physical Laboratory type. This tunnel has been in operation almost constantly for the last three years. It has been used to record numerous measurements and comparisons in the solution of the problems in solution to the turbine scale model as well as the scale. Among these manufacturers who have had models of their products tested in the four foot wind tunnel are included Fairchild Airplane Mfg. Co., Sikorsky Aircraft Corp., Wright Aircraft Corp., Eustace Aircraft Corp., and the Atlantic Aircraft Corp., builders of Fisher planes.

Perhaps one of the most interesting sections of the building is the laboratory for the study of compressed air. It is an area of a large room housing the power plant testing apparatus. On the wall, attached to one of the main structural members of the building is a universal mount for slinging airplane engines for each testing.

In this corner is a rib testing machine of the type developed at the university. It is said that this type of machine has

Design Your Own Airfoils

An American Work
COL. V. E. CLARK

MOST OF the successful airplanes in the United States are airfoils designed by Colonel Clark. Among the most commonly used of his airfoils are the U.S.A. 97 and the Clark V and Clark Y series. There have been used on Colonel Lindbergh's Ryan monoplane and many others of the more classified commercial three-winged monoplane, the "Vought" "Comet", the Navy PB-4B, and the Wright "Aeroplane", all holding world's records, the Glenn Martin Navy 224B, the National Air Transport, Swift and Everett Planes, the Douglas "Rascal-the-World" monoplane, the Curtiss Paraset and the Curtiss Observation, the Consolidated Army and Navy training planes, the Consolidated "Comet", the Douglas Mail Planes and the Douglas Observation and Transport planes, and on many other successful Military, Naval and commercial planes. The characteristics of the Clark V is obtained by high pressure tests at the National Advisory Committee which tested at Langley Field are shown in Fig. 1.

We asked Colonel Clark one day: "How do you go about designing these airfoils of yours? What is the secret?" He laughed and said: "I would gladly tell you the secret



Fig. 1.

if I know of any. The airfoil section just seems to lay itself out, and, when good luck attends, fair results are attained.

"My airfoils have been selected for various airplanes in ocean competitive tests made in wind tunnels at a low rate of the Reynolds's Number have indicated that they are fast good. But, you know, the tests made by our National Advisory Committee for aeroplanes in their variable pressure tunnel at Langley Field prove, if we are to accept them, that even for the purposes of comparison, tests made at a low rate of the Reynolds's Number are useless and misleading in such cases. Airfoils may appear far superior to airfoils for a particular purpose when tested with a pressure of atmosphere, whereas, when tested at twenty atmospheres, all fail. It appears to be much better than that, but for the use of planes. And no one has found such and consistent in air variables to justify a reliable system of rules for the prediction of full scale characteristics, having gone the road only of low scale.

Impossible to Test Every Airfoil

"Therefore it is fair to assume that there are many airfoils which would be more popular than mine if they had been tested with twenty atmospheres' pressure.

"Unfortunately, the Advisory Committee, having undertaken to be skeptical of low scale tunnel test results, cannot do so to measure ourselves as to the merits of airfoils not tested at high values of the Reynolds's Number. Obviously, it would be impractical, and perhaps a grave misdirection of government funds, for the Langley Field laboratory to undertake to test every airfoil presented to it.

"Hence, if low scale tests are not indicative of comparative merit, and since high scale tests are unattainable, or, as the mathematics have not yet been developed for the exact prediction of practical airfoil performance without supporting representations, it may be that we must, for a while longer, select wind tunnels, for this particular purpose, as a means for design problems, design an airfoil as I think it should be to best meet the requirements of the particular case, build our wings accordingly, and hope for the best in full flight results.

"With this in mind, an 'adjustable' airfoil section, up

October 17, 1927

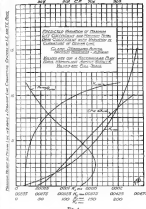


Fig. 2.

which you have the data, has been laid down. By interpolation of the basic section, changing thickness or camber of section line, or both, according to the methods outlined, an infinite number of sections may be obtained, which are useful. Airfoils tapered in plan, or in thickness (taper), or both, may also be constructed and their characteristics predicted. The thickness may be changed to meet structural demands (wing box depth, etc.) and the camber of section line varied to obtain Maximum Lift Coefficient or Maximum Drag (to fit) to meet the 'performance' requirements of a particular design problem. These latter two important determinations—important not only of themselves,—but also, because they usually constitute an index of merit for all

airfoil applicability—have been 'predicted'. It takes a deal of tendency to realize such 'predictions', but, after all, for the reasons stated, these predictions of full scale characteristics probably will neither be confirmed nor contradicted. If they are so more inaccurate for the purpose of full flight performance estimations than low scale tunnel tests, as judged

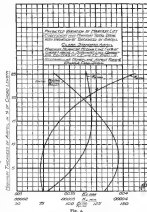


Fig. 3.

by the National Advisory Committee tests, the adjustable airfoil series may be useful.

"The basic data for the basic section are given in Tables I and II.

"The layout method is shown by Fig. 3. A straight 'base' line is first drawn with the desired chord length. Perpendicu-

TABLE I

Ordinate of Median Line. For Maximum Displacement 6800 Chord Length		Distance from Leading Edge, expressed in Terms of Chord Length													
Distance from Leading Edge, in Terms of Chord Length	0.025	0.05	0.075	0.1	0.125	0.15	0.175	0.2	0.225	0.25	0.275	0.3	0.325	0.35	0.375
Y in Terms of Chord Length	0.0224	0.0931	0.2481	0.4851	0.6871	0.8189	0.9700	1.0905	1.0972	1.0471	0.9277	0.7698	0.5814	0.3819	0.1819

Ordinate at Leading and Trailing Edges are 0

TABLE II

Half-thickness Ordinates. For Maximum Thickness 30 Chord Length		Distance from L.E. to Term of Chord													
Distance from L.E. to Term of Chord	0.025	0.05	0.075	0.1	0.125	0.15	0.175	0.2	0.225	0.25	0.275	0.3	0.325	0.35	0.375
Y in Terms of Chord	0.0108	0.0408	0.0822	0.0980	0.1038	0.1084	0.0984	0.0772	0.0472	0.0236	0.0096	0.0036	0.0008	0.0000	0.0000

THERE'S One best way...

TO DO EVERYTHING, your organization spends as much in research and testing as Fairchild to find that one best way... The result, logically sticking to the policy of being satisfied with nothing less than the best has won for Fairchild a position of leadership in each field it has entered. This policy has produced results which are of definite value to every Fairchild Aviation product and to every dealer who represents Fairchild.

FAIRCHILD products are built to definite standards and are stamped with the flying horse "Fegusa." This means that not only have high grade materials been the right material for each purpose, but have also been subjected and tested in our own laboratory to the greatest perfection. They mean that every product meets the test of the latest and most progressive engineering and that for only one standard... performance.

Fairchild customers purchase products more real value for the dollar. They are manufactured in modern factories with modern machinery and sold at a fair profit. Inspection manufacturing economies result from the strict control of all service standards mean that the product is as good as before. Fairchild really knows a representative as well as the product is responsible.

Some Fairchild products are combinations with every facility for analysis. The majority of Fairchild products are bought by private facilities for test, bought on the belief that if a product is built of the best material, the best engineering and fine work-

manship and that there is no interpretation of the word service that will not be carried out to a letter.

The Fairchild Aviation Corporation was formed to organize or acquire, finance, and manage subsidiaries in both the manufacturing and operating fields of the aviation industry. Each subsidiary corporation is complete in itself with its own administrative, production and sales departments. Yet each one profits from the organization, financial strength and guiding hand of the parent organization. The Fairchild Aviation type of organization is unique in the aviation industry. The opportunities for advanced engineering, economies of mass purchasing and manufacturing, mass sales and distribution resulting from this type of organization are evident and have been amply demonstrated by the largest organization in the automobile industry.

Today, Fairchild Aviation controls Fairchild Aerial Camera Corp., manufacturers of precision automatic aerial mapping cameras, Fairchild Aerial Surveys, Inc., pioneer and largest producers of aerial maps, Fairchild Airplane Mfg. Corporation, manufacturers of airplanes, pontoons and flying boats, Fairchild Common Engine Corporation, manufacturers of an improved type of aircooled airplane engine, Fairchild Flying Corp., local operators of airplanes for photographic and test work, and in Canada, Fairchild Aviation Ltd., general agents for Fairchild products, operators of aircraft for test and photographic work, and in Mexico, an associated company, Compania Mexicana de Avianes.



FAIRCHILD



Aircraft Trade Notes

Von Hoffmann Aircraft Co. to Distribute B. F. Mahoney Planes

THE VON HOFFMANN AIRCRAFT CO. of St. Louis, Mo., is now distributor for the B. F. Mahoney Company aircraft in that territory. One of the Ryan Expeditions has already been added to a resident of St. Louis. The Hoffmann is the main place that Colonel Lindbergh flew, adapted to passenger carrying and is now made by the B. F. Mahoney Aircraft Corp.

The Von Hoffmann Aircraft Co. was formed last summer by A. Von Hoffmann and B. Von Hoffmann, who are internationally known balloonists, and Milton Orban, who is pilot of many years' experience. In addition to the above the partnership of the company includes John C. Simpson, a wartime pilot, "Red" Jackson, Art Kinnard, and J. Stahl. In addition to being distributors for Mahoney aircraft the company conducts an aerial taxi business, carries passengers on pilot wire runs, does aerial photography and conducts a flying school.

The student receives a minimum of 15 hr. in the air. If the end of that time his instructors feel that he has not had enough practice to fly safely and steadily he is given further instruction as a part of his course. In addition to the usual ground work assigned, the latter a lecture class is held twice a week. At this lecture, which is given at night, notes and their meanings, construction of the airplane, the function of the different parts, aerial navigation, meteorology, theory of flight, and commercial air regulations are discussed and studied. Quite a few are awarded for this lecture course who are not taking flying instruction. By attending to this lecture class awarded people who are not taking the flying instruction the Von Hoffmann Company is helping to make St. Louis a little more air-minded and at the same time the school should prove a good receiving ground for their flying school. In the end the whole industry will benefit of course from increasing the air-mindedness of the public.

The present equipment of the Von Hoffmann Company consists of a Ryan Expeditions, a Ryan open cockpit plane with a Haco engine, an Eaglehawk, and another Ryan Expeditions has just been received while two more are on order for immediate delivery.

Aircraft Firm Moves to Buffalo

A NEW airplane manufacturing plant has been built at Buffalo, N. Y., is announced by William B. Kennel, industrial company owner of the Buffalo Chamber of Commerce. The Hall Aluminum Aircraft Corp. has decided to move to that city and will use a portion of the space assigned by the Aluminum Company of America at 2500 Elmwood Ave. and will produce all metal airplanes.

The Hall company has been operating the same time at Mount Vernon, N. Y., where it has been specializing in all-metal planes for the United States Army and Navy. The company was formerly known as Charles Ward Hall, Inc. Charles Ward Hall of Lancaster, Pa., Y. Y., and others associated with the firm are Charles O. Pope, New York City and Alexander M. Orban of Buffalo, N. Y. The Aluminum Company of America at Buffalo and several Buffalo men have become financially interested in the company, some of whom will serve on its board of directors.

The company was informed in coming to Buffalo by that

city's large supply of trained aircraft labor and the fact that the Buffalo Air Division as evidenced by the construction of the Buffalo airport, one of the finest in the world. The facilities offered by way of space at the Buffalo airport for the aluminum company were a factor also.

The Chamber of Commerce points out that there are now five airplane manufacturing companies in Buffalo, two of them being purely local companies and three having moved to Buffalo after operating in other cities.

Manufactures First Plane

THE RYAN MECALISMS MONOPLANE CO., San Antonio, Calif., recently completed and built its first plane, a Whitehouse Oceanic monoplane, using a Wright Whirlwind engine. Incidentally it is the same engine that Lindbergh used on his Horsa for his scheduled long distance flight.



This view of the Oceanic monoplane "Wing Southern California" built by the Ryan Mecalisms Co. of San Antonio, California. The plane, "Wing" Ryan, was built by Mr. Ryan and Mr. Hensel, former the company a short time ago. All of these men worked on Colonel Lindbergh's "Spirit of St. Louis."

This Oceanic monoplane, which was named "Wing Southern California," was intended for the mainstay race from New York to Spokane as part of the National Air Derby last fall but was not completed.

A. E. Peterson Joins N.A.T.

ALVIN E. PETERSON, who for the past year has been general superintendent of the air mail line owned by officers of that organization, the services of the air mail service by the Post Office Department having been suspended. He will be affiliated with the National Air Transport line, of Chicago.

Since the suspension of the operations of all air mail lines by contract service Mr. Peterson has been engaged in the going of the air mail service properly related to several million dollars, much of which was transferred to other governmental departments and in various organizations. Mr. Peterson has served as superintendent of the air mail service for one year, having been promoted to that post from its assistant superintendency of the contract air mail service.

Side Slips

By ROBERT B. CHAMBER

Mr. E. D. O. calls to my attention the following, taken from a newspaper story of a long distance flight by a Mustang Vixen. "When the pilot was about half way to his destination, a wing on the plane, near where gasoline was stored, caught fire. Observing the danger, he dove down into a bush and extinguished the flames." Mr. E. D. O. indicates that the slipping the rigidity of this accomplishment does not take the dampening away from the California boys, the regular leading game and several others in flight. One can see that the California boys wouldn't have bothered to wait the time required to dive down into the run-down. The landing wing would simply have been cut loose, and replaced with the spare wing from the parts lot, with no loss of all.

Some time ago, Mr. Russell Cassin, columnist of The New York Evening Post, included this bit of poetry in his daily column:

...silly side in Thin Herley:
We hope her airplane doesn't crash.
Having come, been formally presented to Miss Randa, and on the poem might better have gone something like this:

A really side in Thin Herley:
The words around her nearly speak up
"Watch Your Officers Landing Shortland Air Taxi Service
Cheap!"
Headline

The secret of success on that line is in the last word.

It is wonderful what can be done toward solving some of the worst problems confronting aviation when our great minds really get down to it. Before us is a copy of a "business" magazine in which the editor presents not only one but several methods whereby aircraft may find landing fields in fog. These schemes range all the way from a string of "induced" balloons which the pilot follows by means of an altimeter, to a string of balloons and rope, which means the fog itself. The other scheme of all, we think, is the one in which the editor proposes to mount a machine with a "city landscape view" at the field which continuously only on the name of the particular field, the pilot presumably wandering along and he leaves his station called out. "Well like 20 years ago we make ahead of time if one of these devices were installed at any flying field, what a..." We might make a bit of a profit selling some real estate "short?"

An international engineer friend of mine tells me of a letter he recently received from a potential inventor. His correspondent admits that his invention will give a great impetus to the development of aviation, but before he can go ahead with it, he needs an answer to this question,—"What is the greatest weight that any airplane has ever lifted or failed to lift?" Our friend thinks that fifty tons is the correct answer to this question but suggested that it be submitted to the editors of AVIATION for checking before he answers the inquiry.

The newspaper announces that a fight between the "world's two leading Polish cities—Warsaw and Chicago" will be attempted next year, with Captain Kowalski as pilot. We hope the fight will be a success, but we doubt any contribution to be transferred at the banquet of celebration afterward.



ONE OF THE BOEING AIR MAIL PLANES

Powered with Pratt & Whitney "Wasp" 425 hp. Engines

Equipped with

SCINTILLA

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SCINTILLA MAGNETO COMPANY, INC.

Contractors to the U. S. Army and Navy

SIDNEY, N. Y.

FOREIGN AERONAUTICAL NEWS NOTES

By Special Arrangement with the Automotive and Transportation Divisions,
Bureau of Foreign and Domestic Commerce

Australia Votes Additional Millions

The Australian Federal Government has decided to allocate £200,000 for the development of civil aviation in addition to the normal expenditure of £115,000.

It is hoped by this move to encourage aviation sufficiently so that the distant parts of the Commonwealth can be brought to within four days' travel from the nearest capital of the nation. One of the first routes under consideration will be from Sydney to Melbourne, where air service will cut the traveling time from 27 to 7 hr.

A service from Sydney to Melbourne is also contemplated and would afford a great saving in time over present train schedules.

It is hoped eventually also to inaugurate a service between Melbourne and Tasmania, but to insure safety and regularity over the route, a good portion of which would be regularly open sea, requiring three engine planes, a much greater initial expense would be incurred. It is a question whether or not, with the traffic that could be expected as present, such a service would be profitable even with a government subsidy. Another projected route is from Cairns, in Western Queensland, to Darwin, the capital of the Northern Territory, where an air service would shorten the communication of mail from Brisbane to Darwin in three days instead of eight, and would provide of a weekly service as against the present monthly one.

Rotterdam Aviation School Established

The Nationale Luchtvaartschool (National Aviation School) at Wassenaar, opened Sept. 16, under the auspices of the Netherlands Aero Club.

The school will have the advantage of the guidance and counsel of several officials of the Aviation Division of the Department of Public Works and of the K.L.M. and the support of the municipality at Wassenaar, which will provide the training field without charge.

The Rotterdam Aero Club was able to raise more money by private donations, approximately \$75,000, to finance the project, including the purchase of two Fokker planes for training purposes.

The Department of Public Works of the National Government, before lending its aid, required that the school be of assistance, will be open to nonmembers as well as to members of the club.

New Airlines for Czechoslovakia

The establishment of an express London-Prague is under consideration by the Montreal Council. The Czechoslovak Aviation Society has submitted two plans for the line. One in connection with an English company, which would go by way of Cologne, the other in connection with a Dutch one, which would go to Rotterdam and then connect with a line to London.

Regular air service between Prague and Amsterdam was opened during the summer. Flying time is one hour. There are two flights in each direction every day, at 8:15 A. M. and 3:35 P. M. from Prague and 9:15 A. M. and 6:35 P. M. from Amsterdam.

Work has been started on a new light tower at Edin, (Prague Airport). The flying field is to be enlarged and the wooden hangars replaced by concrete ones. The tower is

24 meters high, is hexagonal in shape, and serves also as a water reservoir. It is equipped with electric lights of 150 c.p.

The Ministry of Public Works has purchased a light tower, which was captured at the Franco-Spanish frontier. This tower will be erected at the Brno Field. The Ministry is negotiating for the purchase of lights which will be put up around the Prague Field.

One of the six projects for flying fields in Czechoslovakia has been inspected by a committee of the Ministry of Public Works and found satisfactory. The necessary hangars and hangars will be put up this autumn and next spring and the field should be open for service next season.

Regular Cherbourg-Southampton Service

Travelers to England via Cherbourg, France, can now complete their trip by a seaplane.

When all present plans across the Channel by flying boat will be started and whenever required, the English Airways is now considering ways and means of establishing a regular air line between the two ports. A new machine will shortly be placed in the service if it is decided. This machine is a large "Hudson" seaplane, constructed by S. E. Saunders, Ltd. of Dover. It is fitted with two Bristol "Superior" engines and carries ten passengers in addition to a pilot and co-pilot.

Cherbourg Airport Campaigns Continues

The Cherbourg Chamber of Commerce continues its campaign to make Cherbourg an important airport. The Chamber of Commerce has installed a landing landing station as the main building for the use of commercial planes.

The chief obstacle in the way of the development of Cherbourg as an airport is the domes prohibiting planes from flying over Cherbourg or its port or from landing in the harbor. This obstacle of commerce has every intention, however, that this obstacle will be shortly removed. Meanwhile the chamber of commerce is studying the question of the acquisition of a landing field and the scheduling of private aviation enterprises.

The project contemplated in the development of Cherbourg as an airport are: Cherbourg-Nantes-La Rochelle-Bordeaux, with a connection from Cherbourg to Bordeaux, and from Bordeaux to Marseilles and Genoa to Lisbon and Alentejo.

Sevilla-Cadiz Islands Air Mail

The Director General of Communications has been authorized by royal decree to contract directly with the Compañia Española de Tráfico Aéreo for the location of the first unit and for its installation thereafter, he undertakes, as an experimental and with political character, a regular air mail service between Sevilla and Las Palmas and Santa Cruz de Tenerife. C. I.

Estonian Purchases Czechoslovakian Planes

The Estonian Government recently placed an order for a series of modern airplanes with the Czechoslovak National Military Aircrafts factory located at Prague.

The terms and content of this order have not been published as yet but it is believed that the Czechoslovakian government is according the order to encourage Estonian air development.

AIRPORTS AND AIRWAYS

Minneapolis, Minn.

By A. A. Lindberg

During the week around November Radio and Electric Co. held at the Minneapolis Municipal Auditorium, Philip Galt, director of WEAF of New York City, broadcasted his own impressions of Minneapolis, from a plane in flight.

The message was picked up by WCOO, the Minneapolis radio station, and re-broadcasted, both as an unusual attraction for the visitors at the show as well as others and to demonstrate the value of the radio in the progress of aviation.

One of the Consolidated PT-1's (which are replacing the Jovian Air Military service) that have been allotted to the 10th Aero Squadron, Minnesota National Guard, was the plane that was used in the radio feature of the radio show. The Squadron was Major R. A. Miller commanding, Lieut. J. H. Palmer as observer and Arthur G. Hollaway as navigator. The plane has done about 1500 hr. of flying so far this year.

There have been only two forced landings out of approximately 1500 flights made and these were due to minor troubles so that it is a record of which the boys are proud and it should be of interest to the shippers that doubt that there is any safety in flying.

The equipment of this unit is housed in three wooden hangars (15 x 120 ft.), which are located in one group on the 28th ave. field.

There is a commercial oil and gasoline station at the au-

port, as high grade aviation gasoline and oil can be obtained at any time. The field is equipped with 22 large landing lights and as there are men in charge both day and night, it is possible to care for any emergency should there be any one desiring to land after dark.

Lieutenant Kuhnke, who came in from the National Air Races at Spokane stopped over at the field on his way to Duluth.

He had set down his plane near the St. Paul airport after dark as lights were on at that time, but he suffered no injuries nor damage to his plane.

"Spud" Hansen, chief pilot of the Northwest Airways, who is carrying the contract air mail route between Minneapolis and Chicago, was the Chief A. Winter in the National Air Derby between New York and Springfield. There are a number of commercial planes operating from this field so the upper air is generally in use by one or more of the types mentioned here.

Hartford, Conn.

By A. A. Folger

With the purchase by the Aviation Commission of one last parcel of land recently, arrangements have been completed for the further enlargement of Belden Field. Work of grading and preparing the ground will begin at once as it is proposed to have the addition ready for use by next spring.

When finished, the field will be one of the largest municipal fields in the country, provided with cross runways of



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THE Belden Air Transport, Inc., operating the Western Division of the Air Mail service twenty-five new Boeing Planes, represents an investment of over a half-million dollars.

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R. F. Mahoney and Wayne Allen. This is said to be the first time that a plane of this size has flown with a full complement of passengers, only one pilot and no mechanic. Jack Wilson, mechanic, and Lawrence Fells, pilot, landed the plane back in Los Angeles, and Mr. Mahoney has announced that daily flights between the two cities will be made hereafter and with the arrival of the second Ford plane which is expected soon they will hold its place in service between Los Angeles and San Diego.

"Doc" Whitney and J. B. Alexander will open their new American ship at Moss Drive soon. The field will be the most modern in the area as it is having a complete overhaul system installed and will be an all glass layout. Three hangars are already up, one, facing the highway, to be used as a show room, and three hangars are under construction.

This field is to be operated by the American Aircraft Corp., the president of which is Theodore T. Hall, vice president of the Pan American Bank of Los Angeles. It is located between the Pacific Air Transport and Rogers Airport and gives a tremendous flying field coverage of almost a mile when all three fields are considered.

The American Aircraft Corporation is California distributor for West and the new Republic corporation, the first field having just been flown in from New York by Mr. Hall accompanied by Mrs. Hall.

Major C. G. Mosley, vice president and flying superintendent of Western Air Express has recently had his squadron in camp and during the two week training period made several interesting flights. The squadron is equipped with the new PT-1 training plane and a Douglas observation and Douglas transport.

Eight planes flew four hundred miles to Sacramento to greet the premier and make the return eight hundred miles without incident. Twenty seven men made this trip. Later the squadron flew to High Bear Lake and landed there for an overnight camp at an altitude of seven thousand feet.

The squadron also flew an escort to Brig. Gen. Frank P.

Laden on its recent visit to Clover Field and Oak & Pot Airport.

Representatives of the chapters of ex-servicemen at Cedar Rapids, San Bernardino, Ontario, Anaheim, Pomona and Santa Ana were recently flown from Los Angeles to the big Fair at Sacramento by Larry Fells in the big Ford plane operated by Jack Mahoney.

Capt. Charles H. Baker returned yesterday from Ephraim, following the arrival of the 1937 Air Race in this city. He set about at once in his official position as executive committee for the Southern California Chapter of the National Aeronautics Association, to provide ways and means to make this year's meet the biggest and best yet. The chief line of attack is to be an attempt to obtain a municipal airport at once as many local airlines and business men are working hard to bring about an understanding among the various groups interested that will result in our long looked for, city owned airport.

Dopd M. Shelton, secretary, and D. E. McDaniel, president, of the Southern California Chapter of the N. A. A. A. are speaking in a plane of their own construction styled "Puckard Pup". It is a thirty foot wingspread biplane with a 150 Horse engine and to give a maximum speed of 150 m.p.h.

The first landing of the Pacific Air Transport was scheduled at the Moss Drive field by the dispatch of what is said to have been the first mail shipment ever shipped out of Los Angeles. Mayor Cuyler presided at reception at the field.

W. F. Crawford has incorporated the Crawford Motor of Airplane Manufacturing, Inc. and will now open a new lot on the T. W. Hoffman ranch. Mr. Crawford has been in a business locally for several years.

The Brown Mercury airplane was given the initial flight recently with Larry Brown at the controls. Later it was flown by Miss Mildred Miller, of the Palom. The plane is a new fifty horse power engine which gives it a high speed of

115 m.p.h. The Brown Mercury Aircraft Corp. plans to give passengers at once on the job which is a four place high wing monoplane.

Dayton, Ohio

Wright Field, near this city, was dedicated Oct. 12, with Gen. of War Dwight F. Davis and Assistant Secretary of War for Aviation F. Trever Benson, as the principal guests.

The Wright Field, comprising 6,000 acres, is the largest station in the world, both in size and in the far reach-



Wright Field, Dayton, Ohio.

ing research, engineering and experimental work which will be conducted there. The field is the gift of the citizens of

Dayton. In November 1922, a campaign headed by Frederick R. Patterson, president of The National Cash Register Company, resulted in the raising of \$600,000 for the purchase of farms. These later were presented to the government and accepted by President Coolidge in a letter of thanks.

For two years the size of the field has been the scene of much activity. Much progress already has been made. The new administration and other buildings have been erected and program is now being shown in other lines of development.

Brig. Gen. W. E. Gillison, in charge of the Warfield Division of the Air Service, has his headquarters at the Wright Field.

The site is now the first flying field in the world, the old Wright Brothers tract where the two former biplane manufacturers in Dayton tried out some of their earliest experiments with a heavier-than-air flying machine.

Sioux City, Iowa

It is the belief that the first year of operation of Iowa stock car made by a local outfit, that was recently made by H. B. Scott, vice-president of the Iowa Stock National Bank of Sioux City, Iowa.

Mr. Scott left on a tour from Rockhamber Field with Jay and John Cohen of Worthington Springs, South Dakota, and reached Aberdeen, Miss. Thursday at five hours.

They landed on for most at Miles City, Mont., and H. B. Scott stopped at various places to inspect cattle, rabbits to registering issues through his bank.

Norman, Okla.

B. E. Christie Graham, head of the Oklahoma Air Transport Co. here, is recovering from an operation for appendicitis.

Jimmy Hixley, vice president of the Oklahoma Air Transport Co. is attending the University of Oklahoma as a student.



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present in the municipal stadium where he will address several thousand school children. At seven o'clock in the evening, the city of Philadelphia will formally entertain Colonel Lindbergh at a public reception and banquet at the Bellevue-Stratford Hotel.

UNITED STATES AIR FORCES

Mosquito Eradication by Plane

The Navy's new all-metal Ford transport plane, equipped with dousing apparatus and carrying 500 lb. of poison gas combined with powdered arsenite, played a successful demonstration of mosquito dousing by airplane recently at Hump, Ind. The machine used will penetrate the hard dense foliage and kill all mosquito larvae lodged in the water below.

The excellent results obtained by spraying nearby areas at the Marine Corps Base, Quantico, Va., during the past year gave state health officials and representatives at large joint inspection conference in this period of eradication and the demonstration at Hump was entirely successful from the standpoint of the Public Health Service.

An impounded lake, heavily wooded, and which has a thick growth of waterlilies and very few areas of open water, was located on miles south of the city of Hump, Ind. It was selected as an ideal site for a demonstration of dousing. The material mosquito is known as the anopheles and feeds at the surface of the water. As a test of the efficiency of the process, Public Health Surgeon Les Price examined a dipper of water from the swamp before the dousing and found it contained 25 larvae. Four hours later a dipper from the same part of the swamp was examined and the water contained no larvae. Twenty-four hours later the water still contained no larvae.

Army Officer Delegate to Rome Conference

In answer to an inquiry from the Secretary of State in the subject, the Secretary of War has requested the release of Maj. George D. Leland, Jr., Air Corps, as representative of the United States to the International Conference of Aerial Navigation to be held in Rome, Italy, Oct. 28. Major Leland has recently reported for duty in the Airborne Engineer, Rome, as Assistant Military Attache.

Army Air Orders

See Table, Thomas D. Doehs, Inc., is notified in the Air Corps to be returned from assignment to the 1st Air Force, and from duty as chief of staff, Thomas, D., and will proceed to Wright Field, Ohio, to report to the Chief of Staff, Army Air Corps, on Oct. 20. The Air Corps is notified in the Air Corps to be returned from assignment to the 1st Air Force, and from duty as chief of staff, Thomas, D., and will proceed to Wright Field, Ohio, to report to the Chief of Staff, Army Air Corps, on Oct. 20.

Navy Air Orders

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Where of You

ELI LINTON — RYAN AIRLINES — SAN DIEGO
El Linton, San Diego, Calif., is notified in the Air Corps to be returned from assignment to the 1st Air Force, and from duty as chief of staff, El Linton, and will proceed to Wright Field, Ohio, to report to the Chief of Staff, Army Air Corps, on Oct. 20.

New England Aircraft Co., Inc.

New England Aircraft Co., Inc., is notified in the Air Corps to be returned from assignment to the 1st Air Force, and from duty as chief of staff, New England Aircraft Co., Inc., and will proceed to Wright Field, Ohio, to report to the Chief of Staff, Army Air Corps, on Oct. 20.

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FOR SALE

FOR SALE or trade: Home Standard boarder, rebuilt to five place, guaranteed to be in perfect condition, newly covered, new pump; 43 gal cooking section tank, DSI landing gear wheels and tires. Box 356, Lawton, Okla.

HYDROPLANE, Curtiss Single-B, K-4 motor, balance wheels, booster magnets, extra K 6 motor. Perfect condition. Not flown since overhaul. Dr. Hunt, 412 West End Ave., New York City. Phone EDward 0200.

FOR SALE Dual control JN-4 "Canuck". Recently overhauled recently. Excellent condition. Government is wanted and passed. Motor rebuilt this year, turns 1450. Price \$999.00. Also two C-55 pusher props \$15.00 each, one of MP boat wings (2 with leading edge damaged), and one radiator from MP boat. R. W. Lewis, c/o Airport Radio, N. Y.

FOR SALE - BARGAINS 2 Canadian Gests new and complete with Gert overhead OX-6 motors \$950 each - 1 new JN-4D complete Gert overhead OX-6, \$750 - 1 new clipped wing Standard Gert overhead OX-6 motor \$700 - 1 used clipped wing Standard overhead OX-6 motor \$650 - 1 new clipped wing Standard overhead OX-6 motor \$650 - 1 complete \$275 - 2 Gerts overhead OX-6 motors \$775 each - 1 Gert overhead OX-6 complete \$800. Complete standard spare parts for Cessna, JN-4D and J-1 Standard at bargain prices. 1 complete clipped wing Standard Sledge gear. Georgetown, Ont. Phone 222-1111. Write or call Mr. W. H. Williams, OFP's, 721 N. 4th St., Quincy, IL.

FOR SALE: Lamin Standard five place, model A Hoss, total time 80 hours. Side indicators, cooler, water tank, sun-
cup, job, a real money maker \$1,500. or will trade on
smaller ship. Brantford Flying Park, Inc., Box 85, Repulse,
Pa.

FOR SALE Full size paper pattern for all standard wing sections. Ask for prices and state desired width. J. P. Schreiner, 452 Broadway, Milwaukee, Wis.

One set Standard wings, newly covered; Same costs of design applied. For sale in Marburg, A and Ingram, E. G. Hall, 48 Thayer St., Apt. 1 B, New York City

FOOT SALES. With samples, in reasonable offer reduced on either on both (12/5 Standard) brand new from Robertson Airways and OX 5 three place Air-King, used as Comm-similar. Mr. Edwards, 4771-18th Ave., Mrs. Edna 120 778. Phone after 5:30. Berkeley 6973.

SALE OR TRADE 5 place Elm Tree Bar, Hous., serv.
Days 41154-60 Take printer at 41200-60 each, no Mon.
Ph. Jay O. Shuman, Hotel St. Clair Detroit, Mich.

Home A Standard Ice plant. First class condition. Two hours in motor since completely overhauled. New grade A covering last May. Stretched in motor casing. Upholstered passenger cockpit. New landing gear. New 500 wheels, axle, tires and tubes. New South's (barrel) Dual control. Ship always kept in harbor. Made in U. S. near Knoxville, Tenn. 4000 lbs. Weight on new 2 C. C. Collins. Woodford, Ohio.

JENNY 840000 with new single bay back left wing; fuselage shortened, looks like new production ship. Will dominate speed performance. Ship remodeled the car 840000 low cost. George Freeman - 200 Cadillac Via, Houston, N. W.

Latest model Swallow like 300, recumbent, OX-6 2 dia. HX wheels and tires, dual control, 32000. One new Bubble-Buster ship wing Standard, recumbent OX-6 2 dia dual control, both peak propeller, 65180. One used Blue led OX-6 motor, egg-shaped drive and Nemo magnetron, dual peak propeller, booster mag, dual control, 32200. Ships may be seen to be appreciated. Walter S. Raymond, North Everest Dental, Lakeland, Florida.

CURTIS MOTORS.—Four brand new OX-5s and 1 OX-4 in original cases, also OX-5 slightly used. Prices for quantities. A. O. Frost, 51 Green St., Portland, Maine.

Aviation model No. 40 boat, 4 seats, 150 hp. motor, fixed metal propeller. Price \$2,200.00. Curran, 30 17th Ave., L. I. City, N. Y.

Two K-8 motors in good running condition with improved cam shafts. Price per each Three Hundred and Ninety Dollars. Also include three model A Hesse motors. New Orleans Air Line, New Orleans, La.

FOR SALE: One eighter Hino Standard in good Spring condition, center section tank, DDI wheels, overhead valves, dual controls, if desired. Ready to fly away. \$900. Fenton Bros., Island, Mass.

Three-plane Mustang. Landed on aircraft. Can take for more orders now. Send for specifications. Wallace Aircraft Mfg. Co., 4780 Bryson Pl., Mid.-Chicago, Ill.

Standard 2-1 three place OX-5 absolutely same as new Ken. (new government license, motor turns 1425, always kept in garage, never cracked. A real buy! \$650 O.R. Think 11, 55 Sheridan Ave., Hartford, Conn., Ct.

HELP WANTED

WANTED Aeronautical engineers and draftsmen with experience in airplanes. See our Vacancy Cardpage, Broad. P.

CONSISTENT AIRPLANE DESIGNER WANTED: make things of consistent in proofs of computation, size, appearance and format consistent. Aviation Club, the Motor (Hill) Association of Commerce.

Duties: aeronaual, test also man with full knowledge of the requirements of discipline in aircraft design, and use of actual experiences need apply. State full experience and salary required. Apply Hall Amphibians, Inc., Perth A-101, N.Y.

AERO ENGINEER WANTED must be on the design of a Five Plane Cabin job for Whirlwind motor (Don't see in market and who will accept same) who share of profits. **ANSWER**, Box 686

Index to Advertisers

[illegible]

CLASSIFIED ADVERTISING

10 each a week, minimum about \$250, payable in advance. An
 draw system is not suitable. P.O. ADDRESS: 120 W. 17th St., N. Y.

EQUIPMENT WANTED

WANTED: Awe-inspiring glass or trade for 1933 Buick master coach, good condition. Preferably close to Atlantic City. State full particulars. Box 2, Seaside Post, N. J.

WANTED: Hand starters for Liberty matters. Box 112, *freemason*.

WANTED WACO or similar ship in good condition. Will pay cash. No Jokers or Standards. Will pay around \$1800. Wally Gwynon, 1172 Boston View Ave, Lakewood, Ohio.

WANTED for cash, must be a bargain and stand government inspection, Waco 10 or equivalent. Address Realty Co. Monterey Hotel, West Palm Beach, Fla.

Blow or OX-5 Standard. With trade good 1994 special six Honda motor sport model and carb. Bill's Garage, Blomberg, Pa.

WANTED: Flying-boat preferably 5 or 6 place. Must be able and in good condition. Department of Commerce license. Describe fully. Box 704, Astoria.

WANTED OV's in runner condition but seeking overland-
ing. Must be situated on Long Island. T.B.S. Aerial Sur-
vice, Inc., 35 W. 33rd St., New York, N. Y.

POSITIONS WANTED

PILLOT wants posties. Willing to go anywhere, perfect tempers. CRA E-mail: excellent references regarding character and ability. Box 785, Annapolis.

Pilot desires position with reliable company; 2500 hours in the air; mechanical experience dates back to 1912; expert navigator and prefer long duration flying. Willing to go anywhere. Box 608, AVIATION

MISCELLANEOUS CLASSIFIED ADVERTISING

PILOTS make entry noisy; roll themselves first into envelopes, cancelled official "test flights", between experiments, as new air and terminals or mail to Joseph A. McCann, 1000 N. 10th St., Philadelphia, Pa.

Advertisements inserted regularly in AVIATION'S Classified Section pay for themselves many times over.

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Five Place Monoplane



Cruising Range 750 miles

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Fully loaded the usual performance of this type monoplane is at once apparent, quick take-off, slow landing speed, high cruising speed, and excellent maneuverability.

Upholstered in silk mohair with the entire cabin insulated with Balsam wool, owners are finding this newest product of the Mahoney Factory not only efficient and economical but unusually comfortable.

*"The same model that Colonel Lindbergh flew,
adapted to passenger carrying."*

WITH SUPER-INSPECTED J&C MOTOR \$9,700.00

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More Pilots fly them!*

THE remarkable performance of the Fairchild Monoplane, either as a landplane or seaplane, is the result of sound aeronautical engineering, excellent construction, and the Wright "Whirlwind" Engine.

Embodying the modern features of insulated, heated and ventilated cabins, these luxurious planes combine complete comfort for

the passenger and pilot with all the "dash", speed, climb and safety that aeronautical skill has yet evolved.

The record of Wright "Whirlwind" Engine durability, reliability and safety in private flying is just as outstanding as those made in several recent overseas flights, and in over 4,635,000 miles of military and commercial flying during 1926.

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